$$A=\int_0^{\pi}\left(\frac{1}{2}-\frac{\cos 2x}{2}\right)dx.va$$

$$A=\left[\frac{x}{2}-\frac{\sin 2x}{4}\right]_0^{\pi}$$

$$A=\left(\frac{\pi}{2}-0\right)-(0-0)=\frac{\pi}{2}\Leftrightarrow \boxed{A=\frac{\pi}{2}.\|\vec{i}\|.\|\vec{j}\|}$$

4) $V=\pi\int_0^{\pi} f^2(x)\,dx$ (unité de volume)

$$V=\pi\int_0^{\pi}\left(\frac{3}{8}-\frac{\cos x}{2}+\frac{\cos 4x}{8}\right)dx\ u.volume$$

$$V=\pi\left[\frac{3}{8}x-\frac{\sin x}{2}+\frac{\sin 4x}{32}\right]_0^{\pi}$$

$$V=\pi\left[\frac{3}{8}\pi-0\right]=\frac{3}{8}\pi^2\Rightarrow \boxed{V=\frac{3}{8}\pi^2.(uv)}$$

Exercice 14

$f(x)=1+2\cos^2 x;\ x\in[0,\pi]$

1) f est. derivable sur $[0,\pi]$ et

$$f'(x)=0+2\times 2\times\cos x(-\sin x)$$
$$=-4\cos x.\sin x$$

Or $\forall x\in[0,\pi]:\sin x\geq 0$

Le signe de $f'(x)$ est celui de $(-\cos x)$

T.V :

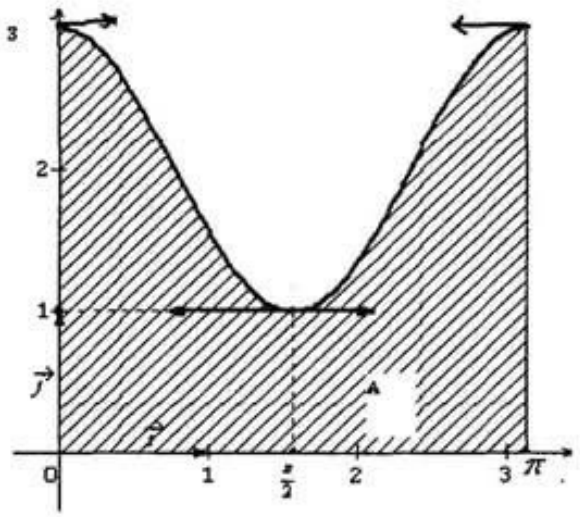
x	0		$\frac{\pi}{2}$		π
$f(x)$		+	0	−	
$f(x)$	3	↘	1	↗	3

$f(0)=1+2\cos^2 0=1+2=3$

$f(\pi)=1+2\cos^2\pi=1+2(-1)^2=3$

$f\left(\frac{\pi}{2}\right)=1+2\cos^2\frac{\pi}{2}=1+0=1$

2)



3) a) $A=\int_0^{\pi} f(x)\,dx=\int_0^{\pi}(1+2\cos^2 x)\,dx(va)$

$$=\int_0^{\pi}dx+\int_0^{\pi}2\cos^2 x\,dx,\ \boxed{\cos^2 a=\frac{1+\cos 2a}{2}}$$

$$=\pi+\int_0^{\pi}(1+\cos 2x)\,dx$$

$$=\pi+[x+\sin 2x]_0^{\pi}=\pi+\pi-0$$

$$=\pi+\pi=2\pi.\|\vec{i}\|.\|\vec{j}\|$$

Donc : $\boxed{A=2\pi.\|\vec{i}\|.\|\vec{j}\|}$

b) $V=\pi\int_0^{\pi} f^2(x)\,dx.uv$

$$V=\pi\int_0^{\pi}(1+2\cos^2 x)\,dx.uv$$

$$V=\pi\int_0^{\pi}(1+4\cos^2+4\cos^4 x)dx$$

$$V=\pi\left[\int_0^{\pi}dx+4\int_0^{\pi}\cos^2 x dx+4\int_0^{\pi}\cos^4 x dx\right]$$

Or on a :

$$\int_0^{\pi}dx=\pi$$

$$\int_0^{\pi}\cos^2 x\,dx=\int_0^{\pi}\left(\frac{1+\cos 2x}{2}\right)dx$$

$$=\left[\frac{x}{2}+\frac{\sin 2\pi}{4}\right]_0^{\pi}=\frac{\pi}{2}.$$

On va linéaires : $\cos^4 x$.

Qarray.tn -Aqra Blech- Qarray.tn